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THE DISTRIBUTION OF FOODBORNE DISEASE BY RISK SETTING – ONTARIO

Introduction

The overall surveillance of enteric diseases in Ontario currently relies on the reporting of disease events by local public-health units to a centralized information system known as RDIS (Reportable Diseases Information System). Outbreak occurrences of enteric disease are reported and documented in the outbreak module of RDIS. Sporadic cases are reported separately using a case-by-case reporting module of the same system. The RDIS database was accessed in order to investigate the distribution of foodborne disease by risk setting. In the process of this investigation, issues concerning the true magnitude of foodborne disease in Ontario were also identified and are presented in the discussion of this report.

Method

The Ontario Ministry of Health provided a file of the RDIS outbreak data for the years 1993 to 1996. For the purposes of this analysis, events were considered foodborne disease outbreaks if the mode of transmission was identified as food regardless of the disease organism involved or if the event was simply given the generic disease classification of "food poisoning".

A previously created file of reported sporadic cases for the period 1990 to 1994 was also reviewed. Again, events were only counted as foodborne disease cases if the source of infection was positively identified as food. Note that only 31% (13,023/41,385) of the records in the data set had information on the source of infection (food or other source) and risk setting (home, restaurant, etc.). The data analyzed are derived from this subgroup.

Results

There were 1,348 outbreaks of enteric disease (approximately 340 per year) reported in Ontario for the period 1993 to 1996. Over one-half of the outbreaks (760) were reported to be associated with person-to-person transmission; their association with food as the original source of infection is not known. Mode of transmission was not identified in 304 of the reported outbreaks. During the 4-year period considered, 280 outbreaks (an average of 70 per year) had food identified as the source of illness, i.e. the mode of transmission was considered food or else the disease was identified as "food poisoning". Eleven percent of these outbreaks did not report the number of cases involved. The number of individual cases of foodborne illness associated with the remaining 89% (248/280) totalled 3,057 or 765 per year: an average of 12 cases per outbreak.

Figures 1 and 2 show the distribution by risk setting of the 280 outbreaks and the cases of foodborne diseases that were reported between 1993 and 1996.

Information was available from the 1990 to 1994 sporadic cases data set on three enteric diseases commonly associated with food: salmonellosis, *Camplyobacter* enteritis, and verotoxin-producing *Escherichia coli* (VTEC) infection, including hemolytic-uremic syndrome. The three diseases represent approximately 80% of all reported enteric diseases in Ontario, excluding giardiasis[1]. Figure 3 illustrates the distribution of these three diseases by risk setting. The total size of the sample where source of infection equaled food was 10,028 over the 5-year period.

Discussion

According to the above review, most outbreak related foodborne illness appears to be associated with foods served from restaurants, catered events, and health-care institutions. Private homes present as the risk setting for most reported sporadic occurrences. The majority of cases are reported through RDIS as sporadic events. For example, in 1993 there were twice as many sporadic cases of enteric disease reported as there were outbreak cases. In addition to outbreak control measures directed to food-service settings, other strategies are needed to reduce foodborne disease.

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Figure 1
Distribution of foodborne disease outbreaks by risk setting, Ontario, 1993 to 1996

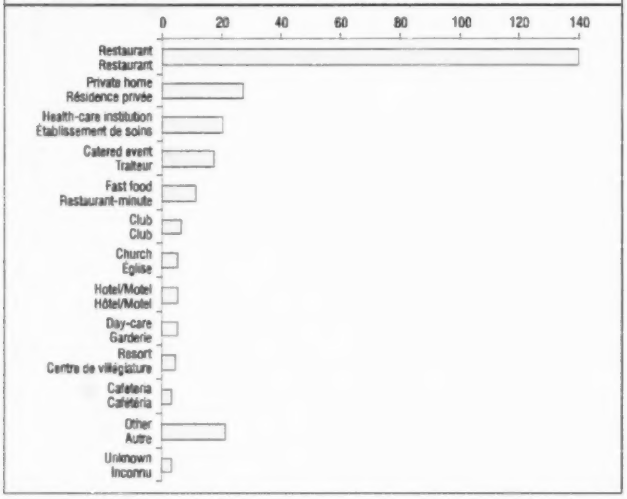
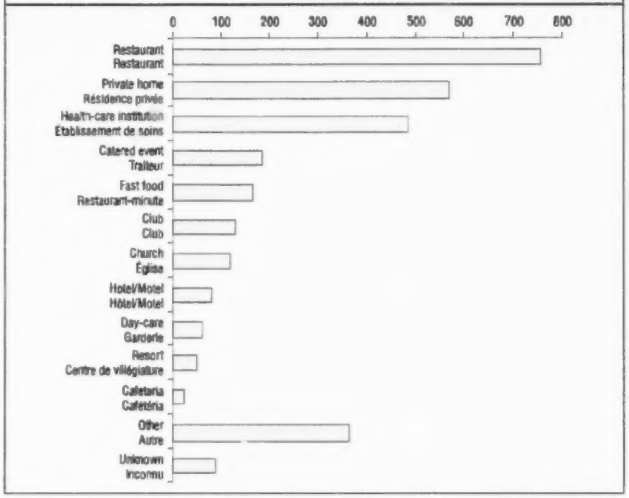


Figure 2
Distribution of cases of foodborne disease associated with outbreaks by risk setting, Ontario, 1993 to 1996

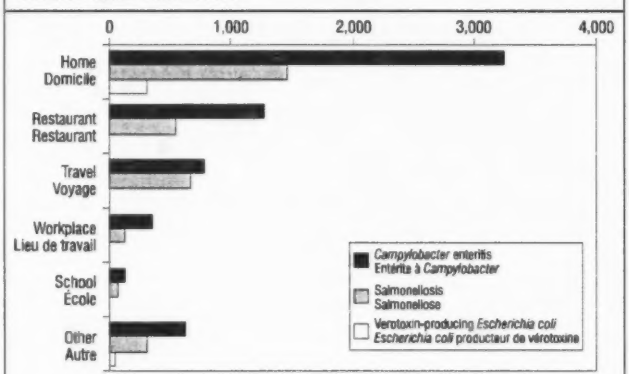


From the prevention strategy point of view, an understanding of both the distribution and the magnitude of disease is paramount for making appropriate assignment of limited resources. According to a national report for the period 1987 to 1989, the number of foodborne outbreaks in Ontario reportedly averaged 600 per year, involving 4,800 cases annually[2]. Another Ontario estimate for the period 1982 to 1989 is much more conservative, with an average of 140 foodborne outbreaks and 1,260 outbreak-associated cases per year (Drs. C. LeBer and S. Styliadias, and M. Brodsky, Ontario Ministry of Health, North York: unpublished observations, 1989). Both of these reports provide values that exceed the counts derived from the current analysis; this is probably because of the restriction to include only those events where food was clearly identified as the source of infection. It is suspected that differences in the method of information collection and in the definitions of foodborne illness, or of what constitutes an outbreak versus a sporadic occurrence, may explain the discrepancies in reporting. For example, the 1987-1989 report estimates that only an average of 220 single (sporadic) cases of foodborne disease are reported annually in addition to the 4,800 cases associated with outbreaks[2]. Further, outbreak reporting in Ontario relied on a paper information system prior to the introduction of the outbreak reporting module of RDIS in 1992.

The true magnitude of foodborne disease in Ontario needs further exploration. It is generally felt that all reported disease represents only a fraction of the true enormity of the problem, particularly since reporting systems largely depended on individuals seeking medical attention and having laboratory confirmation[3,4]. This report on risk settings gives a general impression of where one might target food safety interventions. A clearer understanding of the magnitude of foodborne disease is important when considering the level of commitment to these interventions.

Because of the large proportion of missing data in the files accessed for the current analysis, the potential for sampling bias should be considered when weighing the reliability of the results presented against future reports.

Figure 3
Sporadic cases of foodborne-associated diseases, RDIS, Ontario data 1990-1994*



* Source of infection identified as food.

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Source: *S Isaacs, BScN, MSc, Field Epidemiology Training Program, LCDC, Health Canada, Ottawa; C LeBer, DVM, Public Health Branch, Ontario Ministry of Health, North York; P Michel, DVM, MPVM, PhD, Epidemiology and Surveillance, Health Canada, Guelph Laboratory, Guelph, ON.*

Case Report

POTENTIAL HAZARDS OF BAT REHABILITATION – MANITOBA

On 24 April 1996, the Public Health Branch of Manitoba Health received a report from a veterinary pathologist that Negri bodies had been identified in the brain of a silver-haired bat. Rabies had not been the primary differential diagnosis. The diagnosis of rabies was confirmed by fluorescent antibody testing (FAT) of the brain at the federal Animal Disease Research Institute (ADRI), Lethbridge, Alberta.

In early November 1995, the bat was reported to the Department of Natural Resources; it was hanging onto the outside wall of an apartment building. An employee of the Department of Natural Resources placed the bat in a box and took it home. He then called a zookeeper actively involved in the rehabilitation of sick or injured animals for the Manitoba Wildlife Rehabilitation Organization. The zookeeper was experienced in caring for bats and had built a bat enclosure in her home. The bat remained in the enclosure throughout the winter with no direct contact with humans. The zookeeper reported that the bat appeared well throughout the winter, eating a little once a day until about mid-March; its behaviour was considered "normal" for a bat in semihibernation.

Toward the end of March, the bat stopped eating and became very active during the day. When both keeper and her husband handled the bat and attempted to feed it by hand, it became aggressive and tried to bite them. The bat did latch on the palm of the zookeeper's hand with its teeth. The bat's health continued to decline until it died on 11 April.

The bat was submitted for necropsy to determine the cause of its death. It was diagnosed with rabies, and City of Winnipeg Community Services staff contacted the individuals (the zookeeper, her husband, the employee of the Department of Natural Resources, the veterinary pathologist, and five laboratory staff members) who had had contact or potential contact with the rabid bat. All nine individuals had completed the pre-exposure immunization series with intradermal human diploid cell vaccine (HDCV). In Winnipeg and surrounding areas, all animal handlers requiring rabies pre-exposure vaccination are routinely immunized and monitored through the Manitoba Rabies Prophylaxis Program. Antibody titres are routinely determined 1 year after the series and every 2 years thereafter. Individuals with low antibody levels receive boosters.

The zookeeper, her husband, and the employee of the Department of Natural Resources were considered to be at some risk. Their antibody test results were not immediately available. They were started on the rabies post-exposure vaccination series. The zookeeper and her husband were given two doses of HDCV since they had a past documented serologic response to rabies pre-exposure immunization. The antibody titres in these two individuals were both ≥ 1:128 by tissue culture infectious dose 50 (TCID 50); these were considered to be protective. The employee of the Department of Natural Resources had completed the rabies pre-exposure immunization series a year ago. Antibody testing indicated a very low antibody titre (< 1:8 by TCID 50) which required that he complete the post-exposure immunization series including rabies immune globulin and five doses of HDCV.

The veterinary pathologist and five laboratory staff members were interviewed regarding their handling of the specimens from the bat and their potential exposure to the rabies virus. Their procedures were reviewed with experts from ADRI who concurred that rabies post-exposure vaccination was not indicated for these individuals. The pathologist and the five laboratory staff members had antibody levels ≥ 1:128 by TCID 50.

A second bat had been kept in a separate enclosure in the zookeeper's home during the same time period. One wing had been amputated due to injury and the bat was being used for educational purposes. This bat had been handled more than the rabid bat. There was no contact between the two bats; however, it was euthanized and tested. FAT for rabies was negative.

Incubation periods of up to 7 months have been reported in bats[1], and behavioural changes may not be present or not be recognized. Asymptomatic bats have tested positive for rabies[2]. The length of time that rabies virus is secreted in the saliva of rabid bats is unknown[2]. Indigenous rabid bats have caused rabies in at least 22 humans in the United States[3]. Four cases of human rabies associated with insectivorous bats but without a definite history of bites were reported from the USA in 1995[4]. Three of the four cases of human rabies that have occurred in Canada since 1970 followed exposure to bats (Dr. P. Varughese, Laboratory Centre for Disease Control, Ottawa: personal communication, 1998). Bats should be excluded from houses and surrounding structures to prevent direct association with humans[3].

This case has broad implications for public education of individuals working with wild animals. Such people working in close contact with injured wildlife are at greater risk for rabies exposure than the general public[1]. Since rabies is endemic in bats, any and all exposures to bats need to be considered as a potential risk for rabies and appropriate precautions should be taken.

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Source: *G Howe, BN, MSc, Epidemiology and Surveillance Systems Coordinator, City of Winnipeg Community Services; M Swendrowski, DVM, Veterinary Pathologist, Manitoba Agriculture Services; M Fast, MD, FRCP, Medical Health Officer, City of Winnipeg Community Services, Winnipeg, MB.*

RESPIRATORY VIRUS SURVEILLANCE
FluWatch Project

This update summarizes influenza activity until 13 March 1998. FluWatch has enrolled 191 sentinel physicians representing 140/288 (49%) census divisions in Canada. The physician response rate varies by province and by week. The mean response rate is 65% (41% to 75%). Figure 1 illustrates the standardized cumulative rates of influenza-like illness (ILI) by province for this and last season's FluWatch. Newfoundland, Nova Scotia, and Alberta have the highest rates this season. An increase in the cumulative rate of ILI for 1997-1998 has been recorded in Newfoundland. The standardized rates of ILI reported to FluWatch (Figure 2) during the current season showed an upward trend after week 04 which peaked in week 10 (weeks ending 23 January 1998 and 6 March 1998, respectively). The highest cumulative rates of ILI across Canada by age group, to date, have been in the < 10-year-old age groups (131 per 1,000 patients seen).

Since September 1997, the FluWatch program has received reports on 29,694 laboratory tests for influenza: 4186 have been confirmed as influenza A and 12 as influenza B. The provincial distribution of influenza A isolates which have not been subtyped is as follow: Newfoundland (27), Nova Scotia (41), New Brunswick (81), Quebec (685), Ontario (2,368), Manitoba (128), Saskatchewan (115), Alberta (477), and British Columbia (134). One hundred and thirty influenza A isolates have been further characterized as subtype H3N2. The provincial distribution of influenza A H3N2 is as follows: Saskatchewan (1), Alberta (2), and British Columbia (127). The provincial distribution of the 12 influenza B isolates is as follows: Quebec (3) and Ontario (9).

From November 1997 to 6 March 1998, the National Laboratory for Viral and Zoonotic Pathogens, Laboratory Centre for Disease Control, has completed strain characterization on 125 influenza A isolates: 86 are A/Sydney/5/97 (H3N2)-like, 32 are A/Wuhan/359/95 (H3N2)-like, and 7 are A/Texas/36/91 (H1N1)-like. The provincial distribution of the 86 A/Sydney-like isolates is as follows: British Columbia (4), Alberta (1), Saskatchewan (6), Manitoba (7), Ontario (49), Quebec (15), and New Brunswick (4). The provincial distribution of the 32 A/Wuhan-like isolates is as follows: British Columbia (1), Alberta (4), Saskatchewan (2), Ontario (2), Quebec (20), New Brunswick

Figure 2
Standardized rates of ILI across Canada, by week, reported to FluWatch, 15 October 1996 to 20 March 1997 and 15 October 1997 to 20 March 1998

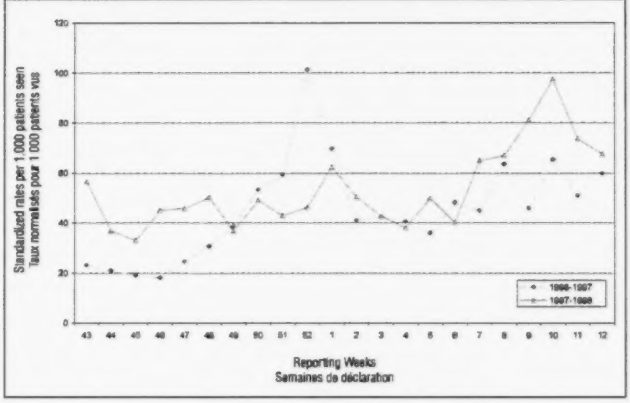
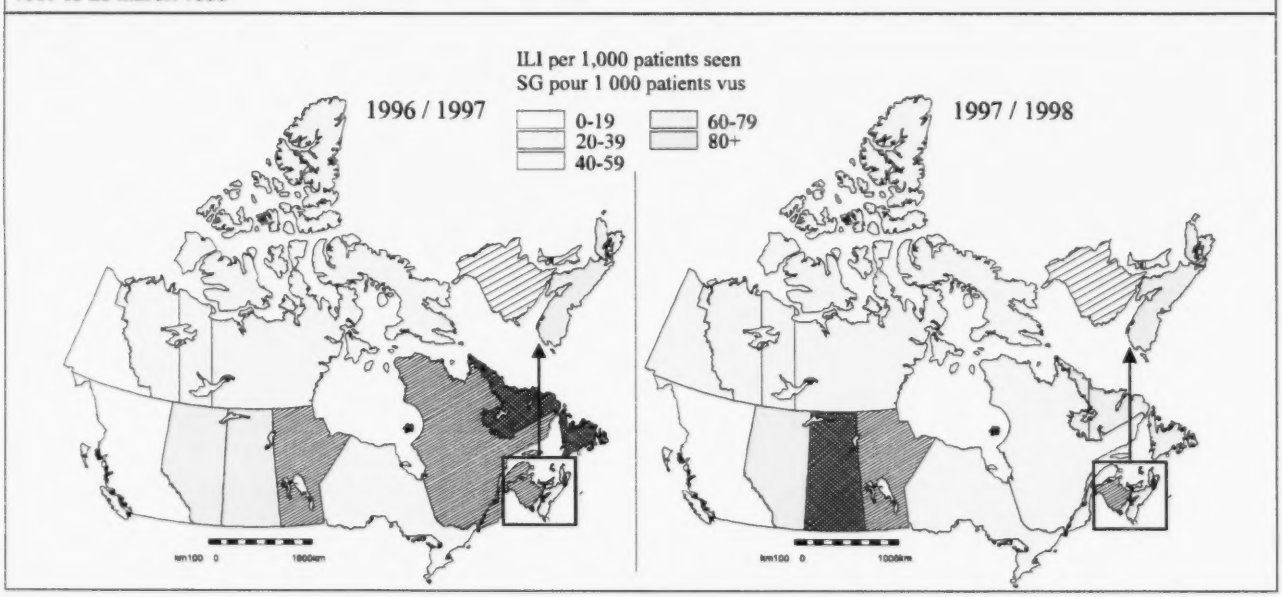


Figure 1
Standardized rates of ILI across Canada, by province, reported to FluWatch, 1 October 1996 to 20 March 1997 and 15 October 1997 to 20 March 1998



(1), and Nova Scotia (2). All A/Texas-like isolates are from Ontario.

As of 18 March 1998, international influenza activity is still widespread but declining in the northern hemisphere. Most European countries had onset of activity towards the end of January or in the first half of February and reported peak activity in the second half of February or the first week of March. Influenza A has been the predominant influenza type. Where influenza A has been further identified, the H3N2 subtype was most frequently reported. Israel and the United Kingdom have reported more H1N1 subtype than other countries.

FluWatch program reports can be accessed through the FluWatch Website:
http://www.hc-sc.gc.ca/hpb/lcdc/bid/dsd/fluwatch/index.html

Source: *P Buck, DVM, MSc, S Herman, C Scott, B Winchester, MSc, P Zabchuk, P Sockett, PhD, Chief, Division of Disease Surveillance, Bureau of Infectious Diseases; M Vanderkloot, BA, Bureau of Surveillance and Field Epidemiology, LCDC, Ottawa, ON.*

Clarification

MEASLES SURVEILLANCE: GUIDELINES FOR LABORATORY SUPPORT
Vol 24-5, page 33

The last sentence in the first paragraph on page 33, "It will be more and more crucial that all suspected cases of measles be reported, and samples from sporadic cases be submitted for full laboratory investigation." should read as follows: "It will be more and more crucial that all suspected cases of measles be reported, and samples from **all** sporadic cases be submitted for full laboratory investigation."

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